

PATENT COOPERATION TREATY
PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
 (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference B03/0731PC	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/EP2004/013944	International filing date (<i>day/month/year</i>) 08.12.2004	Priority date (<i>day/month/year</i>) 12.12.2003
International Patent Classification (IPC) or national classification and IPC C09K11/06 H01 L51/30		
Applicant BASF AKTIENGESELLSCHAFT		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of _____ sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>		

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

 - international search (Rule 12.3 and 23.1(b))
 - publication of the international application (Rule 12.4)
 - international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

the international application as originally filed/furnished
 the description:
 pages 1-19 _____ as originally filed/furnished
 pages* _____ received by this Authority on _____
 pages* _____ received by this Authority on _____
 the claims:
 nos. 1-9 _____ as originally filed/furnished
 nos.* _____ as amended (together with any statement) under Article 19
 nos.* _____ received by this Authority on _____
 nos.* _____ received by this Authority on _____
 the drawings:
 sheets _____ as originally filed/furnished
 sheets* _____ received by this Authority on _____
 sheets* _____ received by this Authority on _____
 a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. The amendments have resulted in the cancellation of:

the description, pages _____
 the claims, nos. _____
 the drawings, sheets/figs _____
 the sequence listing (*specify*): _____
 any table(s) related to sequence listing (*specify*): _____
4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

the description, pages _____
 the claims, nos. _____
 the drawings, sheets/figs _____
 the sequence listing (*specify*): _____
 any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
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1. Statement

Novelty (N)	Claims	1 – 9	YES
	Claims	_____	NO
Inventive step (IS)	Claims	1 – 9	YES
	Claims	_____	NO
Industrial applicability (IA)	Claims	1 – 9	YES
	Claims	_____	NO

2. Citations and explanations (Rule 70.7)

The subject matter of claims 1–5 relates to the use of neutral platinum(II) complexes as emitter molecules in organic light-emitting diodes, the complexes being selected from a group of compounds defined by the Markush formulae I to III (platinum(II)-phosphine, platinum(II)-bathophen, and platinum(II)-bipyridyl complexes, in this order). Claims 6–9 claim a light-emitting layer which consists of these complexes and devices which use the same. During the examination procedure, an embodiment example was submitted as subsequent technical information (STIN), illustrating the use of Pt(dppb)₂(CN)₂ as luminescent layer in an OLED.

This report makes reference to the following documents, and their numbering in the examination procedure will be retained:

- D2 : KUNKLEY H., VOGLER A.: J. AM. CHEM. SOC., Vol. 112, 1990, pages 5625–5627
- D3 : CHE. C.-M. ET AL.: J. CHEM. SOC., CHEM. COMMUN., Vol. 14, 1989, pages 943–944
- D4 : US-A-2003/022019

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Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

D2 discloses the photoluminescence of platinum(II)-(4,7-diphenyl-1,10-phenanthrolin)(CN)₂ (in accordance with formula II) in the form of a solution.

D3 discloses the photoluminescence of platinum(II)-(5,5'-dimethyl-2,2'-bipyridine)(CN)₂ (in accordance with formula III) in the form of a solution.

D4 discloses the use of wolfram bathophen and bipyridyl complexes as emitter molecules in organic light-emitting diodes.

None of the citations discloses the use of the compounds mentioned in the present application as emitter molecules in organic light-emitting diodes. Consequently, the subject matter of claims 1-9 is novel (PCT Article 33(2)).

Either D2 or D3 can be selected as closest prior art, owing to the similarity of their disclosures. The subject matter of claim 1 differs from D2 or D3 in that the luminescent compound is used as emitter substance in organic light-emitting diodes. In D2 or D3, the luminescent properties of these compounds is disclosed, but only in the dissolved form (in a solvent). Moreover, D2 and D3 discuss the photoluminescence of the compounds, while the present application relates to electroluminescence.

These two important differences would prevent a person skilled in the art from combining the compounds mentioned in D2 or D3 directly with the teaching of a document

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

which discloses a similar OLED device (for example, D4), and from solving the problem in the same manner. Since this combination is not obvious to a person skilled in the art, the subject matter of claims 1-9 involves an inventive step (PCT Article 33(3)).